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Charles A. Bottemiller
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GNRO2005-00018

April 6, 2005

U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, DC 20555-0001

Subject: LER -2005-001-00 [Reactor Scram 109 on February 11, 2005, Due To Loss Of Service Transformer 11]

Grand Gulf Nuclear Station, Unit 1
Docket No. 50-416
License No. NPF-29

Dear Sir or Madam:

Attached is Licensee Event Report (LER) 2005-001-00 which is a final report.

This letter does not contain any commitments.

Yours truly,

CAB/MJL
attachment: LER 2005-001-00
cc: (See Next Page)

GNRO2005-00018
April 6, 2005

cc: NRC Senior Resident Inspector
Grand Gulf Nuclear Station
Port Gibson, MS 39150

U. S. Nuclear Regulatory Commission
ATTN: Dr. Bruce S. Mallet (w/2)
Regional Administrator, Region IV
611 Ryan Plaza Drive, Suite 400
Arlington, TX 76011-4005

U. S. Nuclear Regulatory Commission
ATTN: Mr. Bhalchandra Vaidya, NRR/DLPM (w/2)
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Washington, DC 20555-0001

Mr. D. E. Levanway (Wise Carter)
Mr. L. J. Smith (Wise Carter)
Mr. N. S. Reynolds
Mr. H. L. Thomas

NRC FORM 366 (6-2004) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB: NO. 3150-0104 EXPIRES: 06/30/2007

Estimated burden per response to comply with this mandatory collection request: 50 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the Records and FOIA/Privacy Service Branch (T-5 F52), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to infocollects@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202, (3150-0104), Office of Management and Budget, Washington, DC 20503. If a means used to impose an information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

LICENSEE EVENT REPORT (LER)

(See reverse for required number of digits/characters for each block)

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4. TITLE

Reactor SCRAM Due to Loss of Service Transformer 11 Caused By Animal Intrusion

5. EVENT DATE			6. LER NUMBER			7. REPORT DATE			8. OTHER FACILITIES INVOLVED	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REV NO.	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
									N/A	N/A
02	11	2005	2005	- 001 -	00	04	06	2005	FACILITY NAME: N/A	DOCKET NUMBER: N/A

9. OPERATING MODE

1

10. POWER LEVEL

100

11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR§: *(Check all that apply)*

- ☐ 20.2201(b)
- ☐ 20.2201(d)
- ☐ 20.2203(a)(1)
- ☐ 20.2203(a)(2)(i)
- ☐ 20.2203(a)(2)(ii)
- ☐ 20.2203(a)(2)(iii)
- ☐ 20.2203(a)(2)(iv)
- ☐ 20.2203(a)(2)(v)
- ☐ 20.2203(a)(2)(vi)
- ☐ 20.2203(a)(3)(i)
- ☐ 20.2203(a)(3)(ii)
- ☐ 20.2203(a)(4)
- ☐ 50.36(c)(1)(i)(A)
- ☐ 50.36(c)(1)(ii)(A)
- ☐ 50.36(c)(2)
- ☐ 50.46(a)(3)(ii)
- ☐ 50.73(a)(2)(i)(A)
- ☐ 50.73(a)(2)(i)(B)
- ☐ 50.73(a)(2)(i)(C)
- ☐ 50.73(a)(2)(ii)(A)
- ☐ 50.73(a)(2)(ii)(B)
- ☐ 50.73(a)(2)(iii)
- ☒ 50.73(a)(2)(iv)(A)
- ☐ 50.73(a)(2)(v)(A)
- ☐ 50.73(a)(2)(v)(B)
- ☐ 50.73(a)(2)(v)(C)
- ☐ 50.73(a)(2)(v)(D)
- ☐ 50.73(a)(2)(vii)
- ☐ 50.73(a)(2)(viii)(A)
- ☐ 50.73(a)(2)(viii)(B)
- ☐ 50.73(a)(2)(ix)(A)
- ☐ 50.73(a)(2)(x)
- ☐ 73.71(a)(4)
- ☐ 73.71(a)(5)
- ☒ OTHER

Specify in Abstract below or in NRC Form 366A

12. LICENSEE CONTACT FOR THIS LER

FACILITY NAME	TELEPHONE NUMBER (Include Area Code)
Grand Gulf Nuclear Station - Michael Larson, Senior Licensing Specialist	601-437-6685

13. COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT

CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX

14. SUPPLEMENTAL REPORT EXPECTED

☐ YES *(If yes, complete 15. EXPECTED SUBMISSION DATE)* ☒ NO

15. EXPECTED SUBMISSION DATE

MONTH	DAY	YEAR

ABSTRACT *(Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines)*

On February 11, 2005 at 1959, Grand Gulf experienced an automatic reactor scram as a result of breaker 552-1105 tripping due to a ground fault on the 34.5 kV bus work of Service Transformer ST11. Loss of ST11 resulted in the loss of power to 12HE, 13AD and 15AA buses. Emergency Diesel Generator (EDG) 11 started on a loss of power and connected to the 15AA bus. All control rods inserted to 00 position. Reactor vessel water level dropped to approximately minus 75 inches on wide range level instrumentation before the High Pressure Core Spray (HPCS) and Reactor Core Isolation Cooling (RCIC) systems, initiated at Reactor Vessel Water Level – Low Low, Level 2 (minus 41.6 inches), and restored level to the normal operating band. Concurrent with this event, EDG 13 (Division III) started on Reactor Vessel Water Level – Low Low, Level 2. Standby Service Water (SSW) started to support EDG operation. Containment isolation occurred as a result of Reactor Vessel Water Level – Low Low, Level 2. The affected bus was lined up to other available power sources. The safety related bus was synchronized back to the grid and the EDGs were secured. Normal feedwater level control was established and both HPCS and RCIC were secured.

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A. REPORTABLE OCCURRENCE

On February 11, 2005 at 1959, Grand Gulf experienced an automatic reactor scram as a result of breaker 552-1105 tripping due to a ground fault on the 34.5 kV bus work of Service Transformer ST11[FK]. Loss of ST11 resulted in the loss of power to 12HE, 13AD and 15AA buses which then caused a loss of Reactor Feed pumps [SJ] and subsequent Reactor Vessel Water Level – Low, Level 3 (plus 11.4 inches) scram. The following items were considered reportable:

- Reactor Protection System (RPS) [JC] automatic actuation on Reactor Vessel Water Level – Low, Level 3 and automatic reactor scram. (Reference: 10CFR50.73(a)(2)(iv) (A) & (B)(1))
- High Pressure Core Spray (HPCS) [BG] automatic initiation and injection on Reactor Vessel Water Level – Low Low, Level 2 (minus 41.6 inches) into the reactor to restore water level. (Reference: 10CFR50.73(a)(2)(iv) (A) & (B)(4))
- Reactor Core Isolation Cooling (RCIC) [BN] automatic initiation and injection on Reactor Vessel Water Level – Low Low, Level 2 into the reactor to restore water level. (Reference: 10CFR50.73(a)(2)(iv) (A) & (B)(5))
- Containment isolation as a result of Reactor Vessel Water Level – Low Low, Level 2 (Reference: 10CFR50.73(a)(2)(iv) (A) & (B)(2)).
- Valid Division I Emergency Diesel Generator (EDG) 11 [EK] automatic start on loss of power. (Reference: 10CFR50.73(a)(2)(iv) (A) & (B)(8))
- Valid Division III EDG 13 automatic start on Reactor Vessel Water Level – Low Low, Level 2 and HPCS Initiation per 10CFR50.73(a)(2)(iv) (A) & (B)(8)),
- Standby Service Water (SSW) [BS] started to support EDG operation (Reference: 10CFR50.73(a)(2)(iv) (A) & (B)(9)
- HPCS injection into the reactor vessel is reportable as a special report per Grand Gulf Updated Final Safety Analysis Report(UFSAR)/Technical Requirements Manual (TRM) section 7.7.2.1.

Additionally, the following events are being included in the LER:

- Both Reactor Recirculation Pumps [AD] were lost during automatic downshift for the Reactor Vessel Water Level – Low, Level 3. The cause of the loss was the pumps could not load on the Low Frequency Motor Generators (LFMGs) due to loss of power.
- Reactor Water Cleanup system [CE] isolated on the Reactor Vessel Water Level – Low Low, Level 2 condition.
- HPCS and RCIC system injections caused cooldown rates to be exceeded due to the cooler water injected into the reactor. In addition, the loss of the Reactor Recirculation Pumps and Reactor Water Cleanup System (RWCU) in conjunction with the cooler water injected by the Control Rod Drive System [AA] resulted in thermal stratification in the lower portions of the RPV. When the RWCU system was restarted, this mixed the stratified water. The stratification and subsequent restart of the recirculation pumps caused the 100 degree Fahrenheit heatup and cooldown rates to be exceeded. (Reference: CR-GGN-2005-00551)

Notification was made to the NRC's Emergency Notification System (ENS) reporting this condition pursuant to 10CFR50.72(b)(2)(iv)(A), 10CFR50.72(b)(2)(iv)(B) and 10CFR50.72(b)(3)(iv)(A) and is being reported under 50.73(a)(2)(iv)(A) – "Any event or condition that resulted in manual or automatic actuation of any of the systems listed in paragraph (a)(2)(iv)(B) of this section……".

B. INITIAL CONDITIONS

At the time of the event, the reactor was in OPERATIONAL MODE 1 with reactor power at approximately 100 percent. Moderator temperature, reactor pressure vessel (RPV) pressure, and RPV water level were at approximately 529 degrees F, 1029 PSIG, and 36.9 inches, respectively. There were no additional inoperable structures, systems, or components at the start of the event that contributed to the event.

C. DESCRIPTION OF OCCURRENCE

On February 11, 2005 at 1959, Grand Gulf experienced an automatic reactor scram as a result of breaker 552-1105 tripping due to a ground fault on the 34.5 kV bus work of Service Transformer ST11. Loss of ST11 resulted in the loss of power to 12HE, 13AD and 15AA buses. Emergency Diesel Generator 11 started on a loss of power and connected to the 15AA bus.

Both Reactor Protective System (RPS) actuation systems actuated although for different reasons. The "A" RPS system actuated on loss of power to the 13AD (power to RPS "A" Motor Generator set) bus since it was powered from ST11 via Balance of Plant (BOP) Transformer 14B. With the accompanying loss of power to the condensate/feed water system components, the "B" RPS system actuated on Reactor Vessel Water Level – Low, Level 3 of 11.4 inches. All control rods inserted to 00 position.

Reactor vessel water level dropped to approximately minus 75 inches on wide range level instrumentation before the High Pressure Core Spray (HPCS) and Reactor Core Isolation Cooling (RCIC) systems, initiated at Reactor Vessel Water Level – Low Low, Level 2 of minus 41.6 inches, and restored level to the normal operating band. Level control was transferred to the Startup Level controller and both HPCS and RCIC were secured.

Concurrent with this event EDG 13 (Division III) started on Reactor Vessel Water Level – Low Low, Level 2 as required. Standby Service Water (SSW) started to support EDG operation. Containment isolation occurred as a result of Reactor Vessel Water Level – Low Low, Level 2.

The affected buses were lined up to other available power sources. The safety related buses were synchronized back to the grid and the EDGs were secured. The under voltage lockouts on the 13AD bus were reset after the bus was tied to available power sources which allowed desired loads to be restarted.

HPCS and RCIC system injections caused cooldown rates to be exceeded due to the cooler water injected into the reactor. In addition, the loss of the Reactor Recirculation Pumps and Reactor Water Cleanup System (RWCU) in conjunction with the cooler water injected by the Control Rod Drive System resulted in thermal stratification in the lower portions of the reactor pressure vessel. When the RWCU system was restarted, this mixed the stratified water. The stratification and subsequent restart of the recirculation pumps caused the 100 degree Fahrenheit heatup and cooldown rates to be exceeded.

No Main Steam Safety Relief Valves (MSRVs) lifted during the event. No plant conditions or evaluations were in progress at the time of the scram that had an effect on the events leading to the scram or on the consequences of the scram. All safety systems functioned as designed and responded properly.

D. APPARENT CAUSE

The ground fault was the result of an animal intrusion which resulted in a bridging of the 34.5 kV bus work of Service Transformer ST11. A dead raccoon was found with indications that it had shorted two phases. Upon entry of the 34.5 kV switchyard, it was discovered that the animal intrusion fence had been de-energized via the "On/Off" switch. It could not be determined how long this condition had existed.

Component Failure - 10CFR50.73(b)(6) defines component failure as the termination of the ability of a component to perform its required function. The following details and evaluates the possible component failures during this event:

Service Transformer ST11 - A technical evaluation concluded that no functional impairments to ST11, the disconnect switch, the bus structures, (including insulators), the Grounding Transformer, or the protective relaying has occurred or has been exhibited by this event. The Service Transformer was subsequently re-energized.

E. CORRECTIVE ACTIONS

Immediate Corrective Actions - An inspection of the animal intrusion fence (electrified) was added to the daily Operations rounds to ensure the fence remains energized. A lock was added to the gate enclosing the affected breaker.

Long Term Corrective Actions - Condition Report GGN-2005-00544 was written to address any additional action.

F. SAFETY ASSESSMENT

All safety systems responded as designed in this event. There was no impact to plant operators or control room equipment. Emergency Core Cooling System (ECCS) initiation and Primary/ Secondary Containment isolation setpoints were reached during this event based on reaching Reactor Vessel Water Level – Low Low, Level 2. There was no impact on safety since ECCS initiation and Primary/Secondary Containment Isolation performed as required.

The cooldown and heatup rates that were exceeded did not compromise the integrity of the reactor coolant system (RCS) pressure boundary or RPV components. As discussed in the Technical Specification (TS) Bases, the Pressure/Temperature (P/T) limits prescribed by TS 3.4.11 are not derived from Design Basis Accident (DBA) analyses. They are prescribed during normal operation to avoid encountering pressure, temperature, and temperature rate of change conditions that might cause undetected flaws to propagate and cause non-ductile failure of the reactor coolant pressure boundary (RCPB), a condition that is unanalyzed.

All components of the RCS are designed to withstand effects of cyclic loads due to system pressure and temperature changes. These loads are introduced by startup (heatup) and shutdown (cooldown) operations, power transients, and reactor trips. Pressure and temperature changes during RCS heatup and cooldown are limited to within the design assumptions and the stress limits for cyclic operation.

F. SAFETY ASSESSMENT (continued)

For this event, an evaluation was performed to determine the effect on the structural integrity of the RCPB components. Stress and fatigue analyses of the affected RCPB components (RPV components and RWCU piping) were performed. The analyses concluded that heatup and cooldown rates assumed for design basis events are bounding from a component stress standpoint. The evaluation also determined that the fatigue usage factor and cumulative usage factor are below code allowable values. Therefore, the structural integrity of the RCPB components was not compromised.

The health and safety of the public was not compromised by this event.

G. ADDITIONAL INFORMATION

Special Report - This is the 18th cycle of the HPCS system experienced at GGNS at rated pressure and temperature. The current nozzle cumulative usage factor is approximately 0.26, which is still within the allowed 0.70 (level which must be reported to the NRC). The ASME Section III Code Allowable cumulative usage factor is 1.0. Report of ECCS injection is submitted as part of this LER in accordance with the special reporting requirements of GGNS UFSAR/TRM section 7.7.2.1

Previous Similar Events - Pursuant to 10CFR50.73(b)(5) the licensee considered this event to be an infrequent event. There has not been any occurrence of the same underlying concern in the past two years at Grand Gulf Nuclear Station. However, a similar event had occurred at Grand Gulf on June 22, 2002 and was documented on LER 2002-003-00.

Attachments:

Attachment 1 - GGNS Distribution Switchyard.

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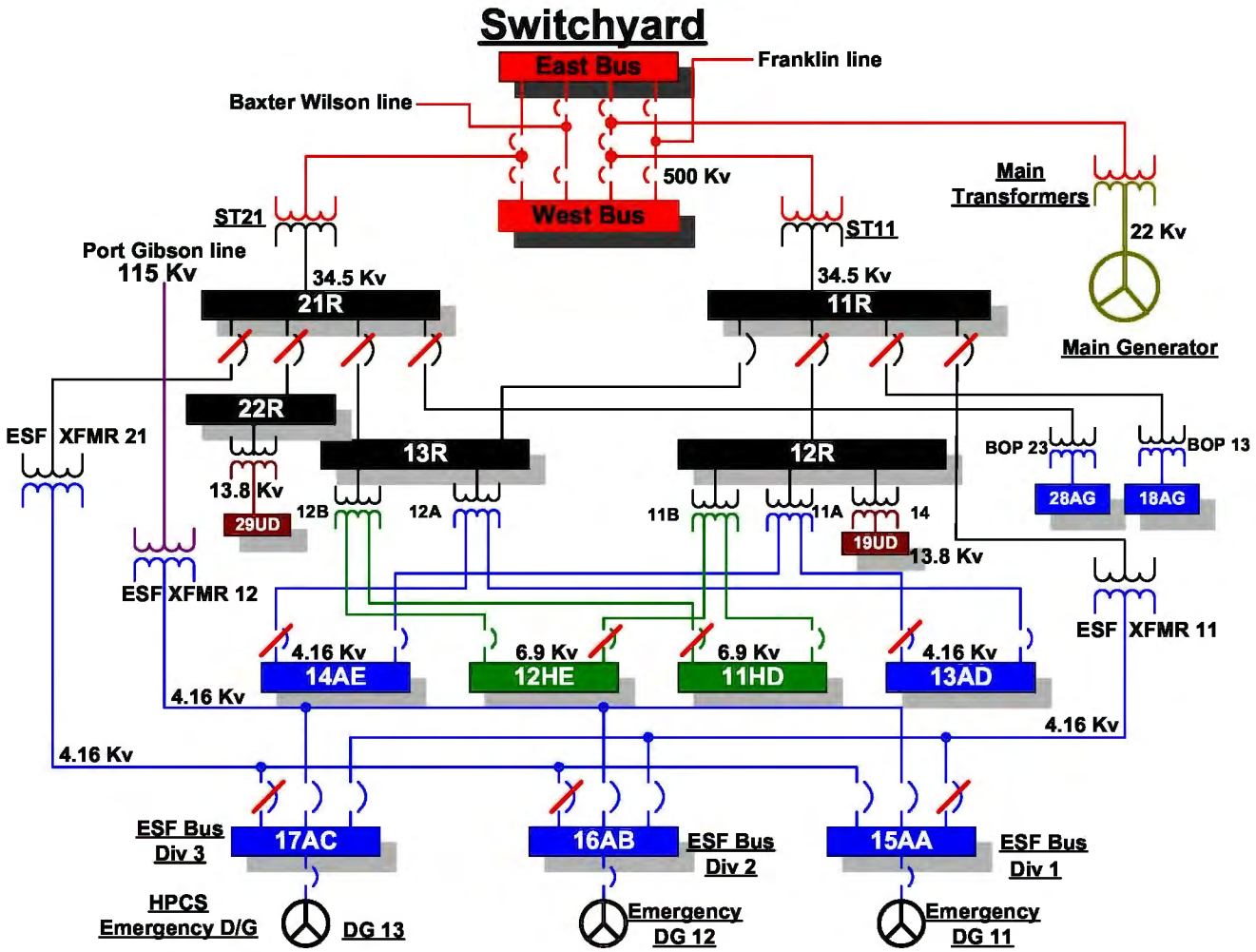
Grand Gulf Nuclear Station
Distribution Switchyard



LER 2005-001-00
Attachment 1
(Ref. UFSAR Figure 8.1-001)